

CLAIMS

1. A continuous method for making a bristle subassembly comprising the steps of:

5 (a) continuously forming a wrap of polymeric filaments by wrapping at least one filament around the axis of at least a three sided mandrel to form wraps of polymeric filaments of sufficient density to pack the filaments in contact with each other and having a moving cable support on each corner running the length of the mandrel on the exterior corner of the
10 mandrel and capable of supporting and moving the polymeric filaments of the wrap along a substantial length of the mandrel;

(b) applying energy to the polymeric filaments of the wrap at the corner of the mandrel thereby bonding the filaments of the wrap together and forming a seam line; and

15 (c) cutting the polymeric filaments of the wrap at a point downstream of where the filaments of the wrap are bonded to each other to form at least one bristle subassembly having at least one row of filament segments extending from the seam line.

20 2. The method of claim 1 wherein the filament for forming the wrap is a monofilament and is of a thermoplastic polymer selected from the group consisting of aliphatic polyamides, aromatic polyamides, polyesters, polyolefins, polystyrenes, styrene copolymers, polyvinylchloride, fluoropolymers, polyurethanes and polyvinylidene chloride, and co-extrusions
25 of any of the above polymers.

3. The method of claim 1 where sufficient wave energy is applied to at least partially melt the polymeric filaments of the wrap and the energy source is an ultrasonic horn operated at 20-70 kHz positioned
30 adjacent to the mandrel.

4. A continuous method for making a bristle subassembly comprising the steps of:

35 (a) continuously forming a wrap of polymeric filaments by wrapping at least one filament around the axis of at least a three sided mandrel having a moving cable support on each corner running the length of the mandrel on the exterior corner of the mandrel and capable of supporting and moving the wrap of filaments along at least a portion of the length of the mandrel;

(b) feeding at least one continuous base element of a melted polymeric bead outside of the wrap of polymeric filaments onto at least one selected portion of the mandrel and maintaining the polymeric bead in contact with the polymeric filaments of the wrap on the mandrel until the polymeric bead bonds with the polymeric filaments of the wrap as the polymeric filaments of the wrap are being moved at least a portion of the length of the mandrel; and

(c) cutting the polymeric filaments of the wrap at a point downstream of where the polymeric filaments of the wrap are bonded with the base element to form continuously at least one bristle subassembly having at least one row of filament segments connected to the polymeric bead.

5. The method of claim 4 wherein the polymeric filament for forming the wrap is a monofilament and is of a thermoplastic polymer selected from the group consisting of aliphatic polyamides, aromatic polyamides, polyesters, polyolefins, polystyrenes, styrene copolymers, polyvinylchloride, fluoropolymers, polyurethanes and polyvinylidene chloride, and co-extrusions of any of the above polymers.

6. A continuous method for making a bristle subassembly comprising the steps of:

(a) continuously forming a wrap of polymeric filaments by wrapping at least one filament around the axis of at least a three sided mandrel having a moving cable support on each corner running the length of the mandrel on the exterior corner of the mandrel and capable of supporting and moving the wrap of filaments along a substantial length of the mandrel;

(b) feeding a continuous stream of a bonding material selected from the group consisting of a solvent for the polymeric filaments or an adhesive for the polymeric filaments outside of the wrap of polymeric filaments onto at least one selected portion of the mandrel and maintaining the bonding material and the filaments of the wrap on the mandrel in contact until the bonding material bonds with the filaments of the wraps; and

(c) cutting the filaments of the wrap at a point downstream of where the filaments of the wrap are bonded to each other to form at least one bristle subassembly having at least one row of filament segments bonded at the base of each bristle segment.

7. The method of claim 6 wherein the filament for forming the wrap is a monofilament and is of a thermoplastic polymer selected from

the group consisting of aliphatic polyamides, aromatic polyamides, polyesters, polyolefins, polystyrenes, styrene copolymers, polyvinylchloride, fluoropolymers, polyurethanes and polyvinylidene chloride, and co-extrusions of any of the above polymers.

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8. A continuous method of making a bristle subassembly comprising the steps of:

10 (a) continuously forming a wrap of polymeric filaments by wrapping at least one filament around the axis of a four sided mandrel having a moving endless cable support on each corner, said endless cable support runs along one corner along at least a portion of the length of the mandrel protruding outward from the intersection of the two side planes of the mandrel which form the corner of the mandrel and runs in an opposite direction in a recessed channel in the mandrel located on a diagonal side of the mandrel
15 from said corner and does not protrude into the plane of the mandrel side and moves the wrap of polymeric filaments along a substantial length of the mandrel;

(b) feeding at least one base strings of a polymeric monofilament outside of the wrap of polymeric filaments on each corner of the mandrel while the wraps are being moved substantially the length of the
20 mandrel;

(c) feeding a continuous stream of a bonding material selected from the group consisting of a solvent for at least one of the polymeric filaments and the base string, or an adhesive for at least one of the polymeric filaments and the base string, outside of the wrap of polymeric
25 filaments onto at least one selected portion of the mandrel in the vicinity of the at least one base string and maintaining the bonding material and at least one of the filaments of the wrap and the at least one base string on the mandrel in contact until at least one of the bonding material and the base string bond with the filaments of the wraps; and
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(d) cutting the filaments of the wrap at a point downstream of where the filaments of the wrap are bonded to form at least one bristle subassembly having at least one row of filament segments bonded to at least one base string.